



# The GenetiSure Postnatal Research CGH+SNP Array (2x400K)

## Product Note

- Superior copy number and copy-neutral aberration detection on one array
- Single exon copy number detection
- LOH resolution validated to 2.5 Mb
- Easily add or remove genes to customize your array
- Complete workflow from a single supplier

### Detect both copy number aberrations and loss of heterozygosity in postnatal samples on a single array

A Human Comparative Genomic Hybridization (CGH) + Single Nucleotide Polymorphism (SNP) postnatal research microarray has been developed to enable high-resolution and simultaneous detection of copy number and copy-neutral changes on the same array, thus increasing efficiency without sacrificing quality. An increased number of SNP probes provide loss of heterozygosity (LOH) detection down to 2.5 Mb and as low as 1 Mb in some cases. Copy number resolution has also been enhanced by dramatically increasing the number of CGH probes in targeted regions, with an average of  $\geq 3$  probes per targeted exon.

### More effective, high-resolution detection of chromosomal variation

CGH analysis has revolutionized the field of cytogenetics by providing accurate identification of copy number variations at greater than 1,000-fold resolution, compared to traditional karyotyping. The development of the Agilent SurePrint G3 Human CGH+SNP platform enabled rapid and reliable identification of both copy number variations and copy-neutral aberrations, such as LOH or uniparental disomy (UPD), in a single array assay. The new GenetiSure Postnatal Research CGH+SNP array brings higher LOH resolution and exon-level copy number resolution to postnatal genetic research studies.

Using the identical high-throughput workflow as previous SurePrint G3 CGH+SNP arrays, the GenetiSure Postnatal Research CGH+SNP array can be quickly incorporated into your cytogenetics research. CGH+SNP arrays can also be easily customized, offering maximum flexibility, while the Agilent 60-mer probes enable high-confidence characterization of copy number and copy-neutral chromosomal aberrations.



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## A customizable platform for simultaneous detection of copy number and copy-neutral variation

The GenetiSure Postnatal Research CGH+SNP array is available in both catalog and custom design formats. The catalog 2x400K array contains ~300,000 CGH probes targeted to regions of the genome known to be disease-associated, sourced from the ClinGen/ISCA database, and ~103,000 SNP probes genome wide (Table 1). The median CGH probe spacing is ~10 Kb in targeted postnatal aberration regions. Copy number changes (amplifications and deletions) are measured using three or more CGH probes for almost 90 % of the covered exons, providing resolution down to the single-exon level. While the current catalog 4x180K array has a resolution of 5 Mb for copy-neutral aberrations (Table 1), the resolution of the Postnatal Research CGH+SNP array is 2.5 Mb, as validated against samples from the 1000 Genome Deep Catalog of Human Genetic Variation. This improvement is due to the increased number of SNP probes.

Custom postnatal arrays can also be readily designed in other formats, including 1x1 million, 4x180K, and 8x60K, using SureDesign, a free web-based application (<https://earray.chem.agilent.com/suredesign/>). The SureDesign database houses more than 28 million CGH probes, and approximately 118,000 probes for SNPs. Multiple array formats provide maximum flexibility to meet sample throughput and cost requirements.

A simple, efficient sample preparation process starts from as little as 500 ng DNA and uses restriction digestion followed by Klenow-based enzymatic labeling (Figure 1). The CGH+SNP arrays are printed on 1x3 inch glass slides and are compatible with Agilent standard hybridization gaskets and chambers. Arrays are scanned at 3 μm using the Agilent SureScan Array Scanner (p/n G4900DA).

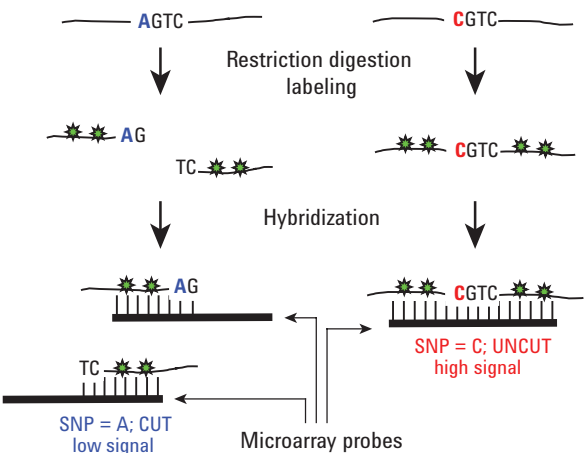


Figure 1. The Agilent CGH+SNP microarrays use the same CGH workflow as the CGH-only arrays. Restriction digestion of genomic DNA allows genotyping of SNPs located in the enzymes’ recognition sites.

Table 1. Comparison of the GenetiSure Postnatal Research CGH+SNP microarray and the Agilent SurePrint G3 ISCA microarray.

	GenetiSure Postnatal Research CGH+SNP 2x400K	Agilent SurePrint G3 ISCA CGH+SNP
Catalog part number	G5974A	G4890A
Number of CGH probes	~ 300,000	~ 120,000
Number of targeted CGH probes	~123,000	NA
Median CGH probe spacing	~9.5 Kb overall, 20 Kb backbone	~25 Kb
ClinGen/ISCA genes, exon coverage	~ 89% ≥ 3 probes/exon	Gene-biased only
Number of SNP probes	~103,000	~60,000
Copy-neutral LOH resolution	~ 2.5–10 Mb	~ 5–10 Mb

## High-resolution detection of copy-neutral and copy number chromosomal aberrations from postnatal samples

Figure 2 illustrates detection of a 2.5 Mb LOH on chromosome 8 that spans multiple genes, including SRD5A2, a gene of interest in postnatal genetic research. The presence of this LOH was validated using 1000 Genome sequencing data. The large number of red and blue dots in this region reflects the targeted nature of the CGH probes.

The same array enables detection of amplifications and deletions as small as a single exon, due to the high number and close spacing of CGH probes, particularly in regions of interest to postnatal genetic research. Figure 3 illustrates detection of a ~120 bp amplification in a gene of

interest (A) and a ~70 bp deletion in a second gene of interest (B).

## Powerful Agilent CytoGenomics Software for both CGH and SNP detection

Agilent CytoGenomics Software for CGH+SNP array analysis enables comparative genome-wide analysis between test and reference samples hybridized to different arrays within the same slide. Copy number aberration calls are determined entirely by non-SNP oligonucleotides, maximizing signal-to-noise ratio (S/N). A SNP call is made from the log<sub>2</sub> ratio of the signal of the sample to the signal of a genotyped internal reference. Regions of copy-neutral LOH are then located by identifying genomic regions with a statistically significant scarcity of heterozygous SNP calls.

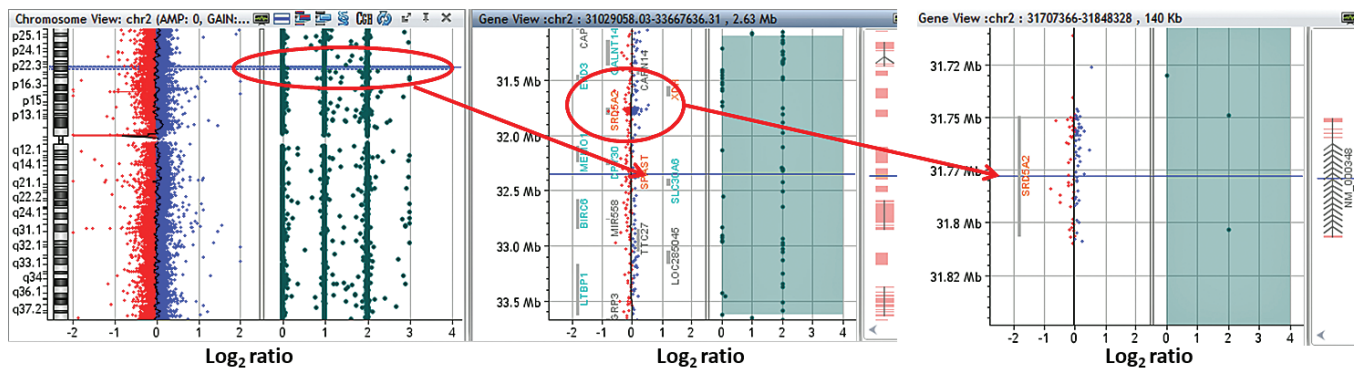


Figure 2. Views in Agilent CytoGenomics software of a 2.5 Mb loss of heterozygosity region (shown in green) on chromosome 2 spanning multiple genes, including SRD5A2, using the GenetiSure Postnatal Research CGH+SNP Research array. Views with increased magnification are shown in the middle and right-hand panels.

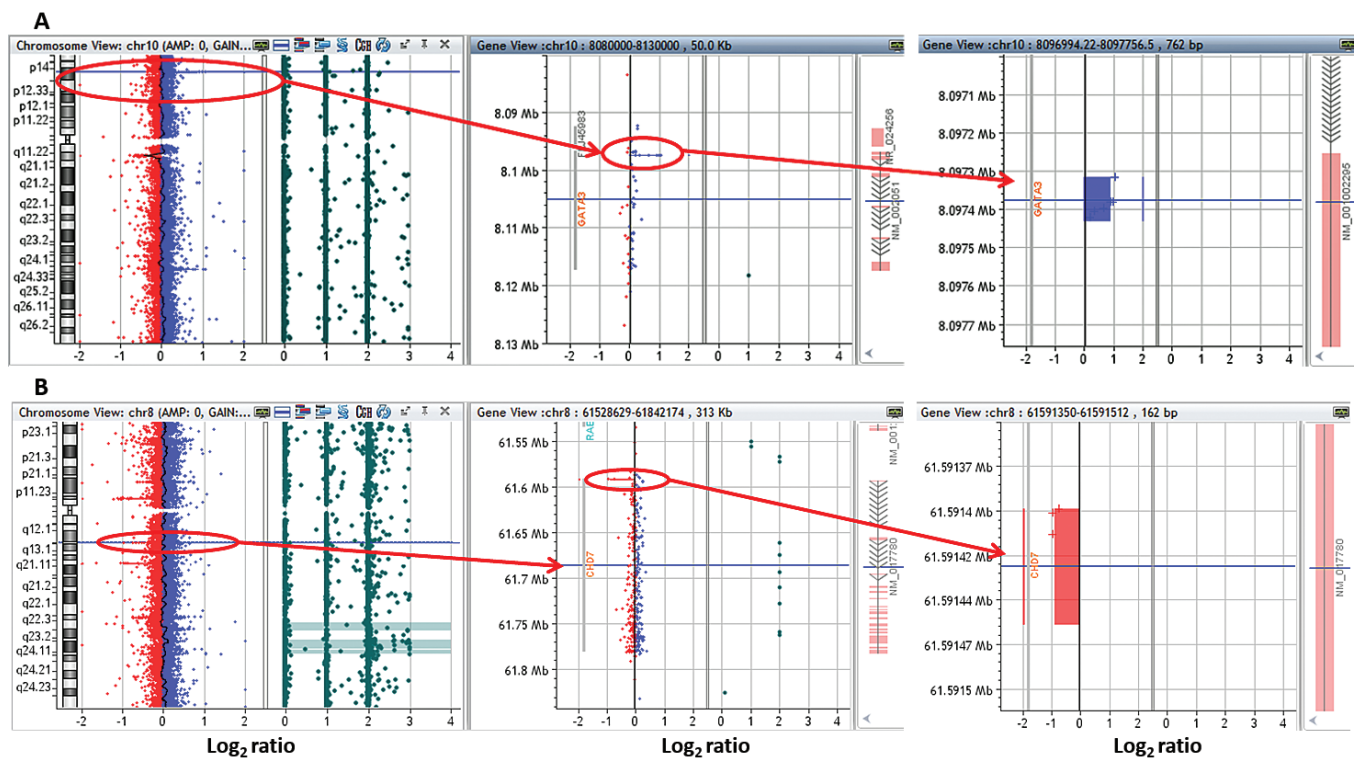


Figure 3. A) A small amplification (~120 bp, blue rectangular region) in a single exon (in pink on the right-hand vertical axis) in the GATA3 gene called using the GenetiSure Postnatal Research CGH+SNP array. B) A very small ~70 bp deletion was detected in a single exon of the CHD7 gene using the array. Views with increased magnification are shown in the middle and right-hand panels. In each case, the array provides increased gene focus, as shown by the presence of many more individual probes, indicated by the red and blue dots.

## Complete CGH array workflow

The Agilent array workflow is streamlined, and takes significantly less time to process samples compared with other array methods. Agilent offers all of the reagents and instruments needed to process your CGH+SNP data including custom and catalog arrays, labeling kits, hybridization and wash solutions, a hybridization oven, the best-in-class SureScan array scanner, and easy-to-use software to identify aberrations (Figure 4).

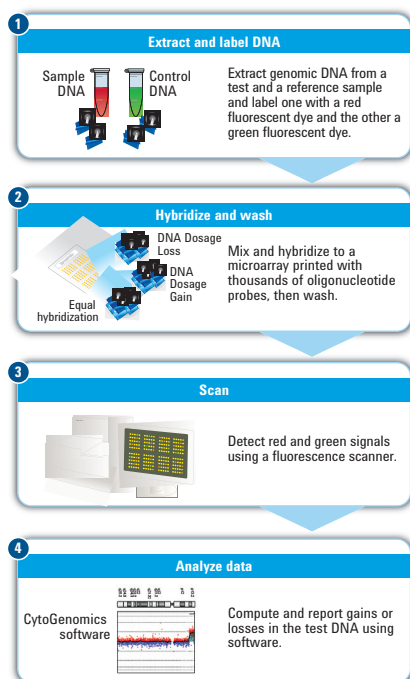


Figure 4. The complete CGH+SNP microarray workflow.

## Ordering Information

Description	No. of arrays/slide	No. of slides	No. of samples	Part number	Stocked/ MTO*
<b>GenetiSure CGH+SNP Arrays</b>					
GenetiSure Cancer Research CGH+SNP Array, 2x400K	2	5	10	G5975A	Stocked
GenetiSure Postnatal Research CGH+SNP Array, 2x400K	2	5	10	G5974A	Stocked
<b>Other CGH+SNP Arrays</b>					
Agilent SurePrint G3 ISCA CGH+SNP Array, 4x180K	4	3	12	G4890A	Stocked
Agilent SurePrint G3 Human Genome CGH+SNP Array, 2x400K	2	1	2	G4825A-028081 (G4842A <sup>†</sup> )	MTO
Agilent SurePrint G3 Cancer CGH+SNP Array, 4x180K	4	1	4	G4826A-030587 (G4869A <sup>†</sup> )	MTO
Agilent SurePrint G3 Custom CGH+SNP Array, 1x1M	1	1	1	G4882A	MTO
Agilent SurePrint G3 Custom CGH+SNP Array, 2x400K	2	1	2	G4883A	MTO
Agilent SurePrint G3 Custom CGH+SNP Array, 4x180K	4	1	4	G4884A	MTO
Agilent SurePrint G3 Custom CGH+SNP Array, 8x60K	8	1	8	G4885A	MTO

\*MTO= Make-to-Order

<sup>†</sup>Former catalog number

Note: Arrays are shipped with a foil seal. After breaking the foil, store microarrays at room temperature, in the dark, under a vacuum desiccator or in a nitrogen purge box. Do not expose microarrays to open air during storage.

[www.agilent.com/genomics](http://www.agilent.com/genomics)

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